Watershed Protection: A Statewide Approach
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Chapter 2. Managing by Watersheds: Common Elements

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States independently develop watershed approaches to fit their unique circumstances. Several key elements have emerged, however, that are common in the approaches developed by states to date (Figure 2-1):

- Management units
- Management cycles
- Stakeholder involvement
- Strategic monitoring
- Assessment
- Prioritization and targeting
- Development of management strategies
- Management plans
- Implementation of the plans.

These are common elements rather than steps; they do not necessarily occur in a sequence. Stakeholder involvement, for example, is crucial throughout implementation of any watershed approach. The following sections describe each of the common elements in more detail.

2.1 Management Units

Management units are the geographic units within which the state will implement its Watershed Protection Approach. States often select major watersheds or basins as their management units, although aquifers, groups of watersheds, or composites of ground water and surface watersheds are also used.

The U.S. Geological Survey (USGS) has designed and mapped a national system of hydrologic units for cataloging, sometimes called HUCs, that provide a common national framework for delineating watersheds and their boundaries at a number of different geographic scales. The hierarchical system's largest units, called water resources regions, are each designated by a 2-digit code. Each regional unit may be subdivided into 4-digit subregions, and further subdivided into 6-digit and 8-digit units representing smaller and smaller watersheds.

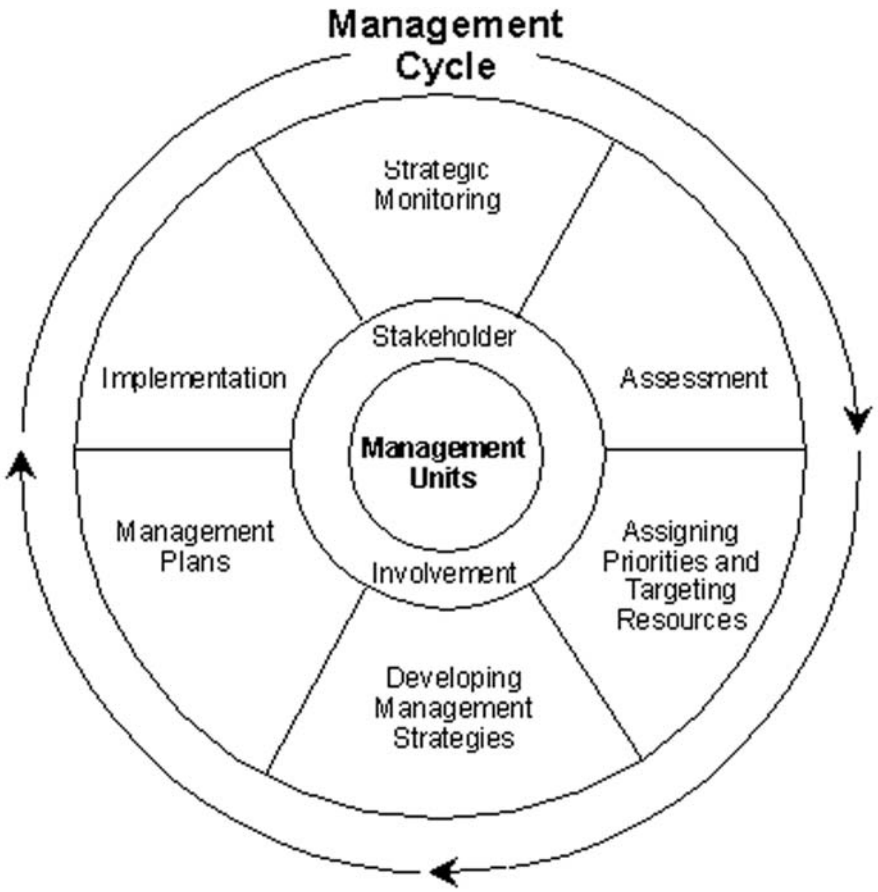


Figure 2-1. Common elements of a statewide watershed management approach

The 8-digit units, which are still fairly large watersheds averaging thousands of square miles each, are the most detailed delineations currently available nationwide as a geographic information system (GIS) coverage or a map. The approach has been carried further in individual states down to the 11-digit and the 14-digit level to delineate watersheds averaging approximately 100 square miles and 30 square miles each, respectively. As hydrologic units will be an important GIS data set within the envisioned National Spatial Data Infrastructure, all watershed programs wishing to delineate smaller-scale watersheds should collaborate with this existing national framework for watershed delineation.

The North Carolina Division of Environmental Management uses river basin boundaries developed in the 1970s under CWA Section 303(e). The state is divided into 17 basins. The South Carolina Bureau of Water Pollution Control took a different approach by combining basins to form five very large basin management units. The highlight on page 2-4 describes water quality management areas used for basin planning by the Washington Department of Ecology. Many states have also delineated smaller watersheds for water quality management. For example, Virginia has delineated approximately 500 watersheds based on NRCS (formerly SCS) delineations; South Carolina and Wisconsin have delineated approximately 270 and 330 watersheds, respectively.

Figure 2-2 shows a "nested" hierarchy of watersheds, including a river basin, USGS Cataloging Units, and NRCS "14-digit watersheds". NRCS has begun a nationwide initiative to delineate 14-digit watersheds for natural resource management. These small watersheds are subsets of both the USGS Cataloging Units and previous SCS-delineated watersheds. North Carolina, for example, has approximately 1,640 14-digit watersheds statewide; they average 30 square miles in size.

The development of fully compatible watershed boundaries typically involves close coordination among USGS, NRCS, and state water quality, coastal management, and GIS agencies, among others. Nested watersheds are important because they offer stakeholders different levels at which to manage water quality. Basins allow the state to allocate resources, while small watersheds are useful for local governments and local NRCS conservation programs. The nested watershed approach also facilitates information exchange among all levels of government, especially if stakeholders are maintaining data in a GIS format.

State of Washington's Water Quality Management Areas

The Washington Department of Ecology has divided the State into 23 water quality management areas. These areas are groupings of several water resource inventory areas (WRIAs) established to respond to the State Water Resources Act of 1971 and as sewage drainage basins to respond to the State Water Pollution Control Act. The criteria used by the Department of Ecology for aggregating the WRIAs into basin planning units are

- Common receiving waters and aquifers, where known
- Complexity of the system and pollution sources
- Staff resources available
- Regional office boundaries
- Water availability and water-short areas
- Water use, including groundwater supply
- Geography
- Areas of population growth (actual and potential)
- Loading from septic systems and sewers
- Ratio of unpermitted to permitted activities
- Water quality condition.

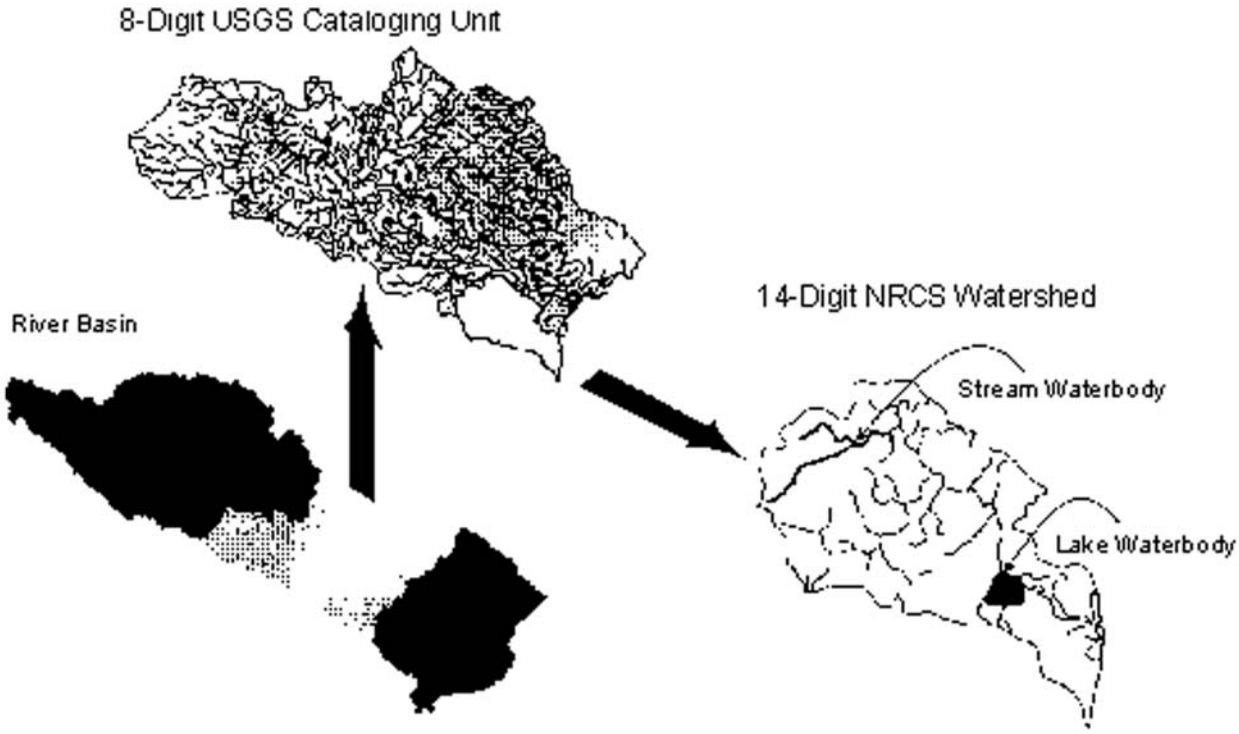


Figure 2-2. Hierachy of nested watersheds (adapted from GIS coverages for the Upper Tar-Pamlico River Basin,NC; RTI, 1994).

Ecoregions represent another important type of boundary and are useful integrators for managing water quality. Ecoregions are areas having physical and biological traits that tend to support characteristic aquatic communities. Ecoregions do not generally coincide with basins or watersheds, and a given basin may cross more than one ecoregion. However, the two concepts (basin and ecoregion) are fully compatible. For example, basin goals might be based on biological criteria for each ecoregion that crosses the basin.

2.2 Management Cycles

Water quality management activities for each major watershed or basin are completed within a management cycle. A management cycle has three features that create an orderly system for continually focusing and coordinating management activities to meet water quality standards and other environmental goals:

- A specified time period -- Key surface and ground water management activities within a basin (e.g., monitoring, assessment, priority setting, management strategy development, plan preparation, and plan implementation) occur within a specified time period. The length of the cycle is state-specific, but most states are using a 5-year cycle to coincide with NPDES permitting requirements.

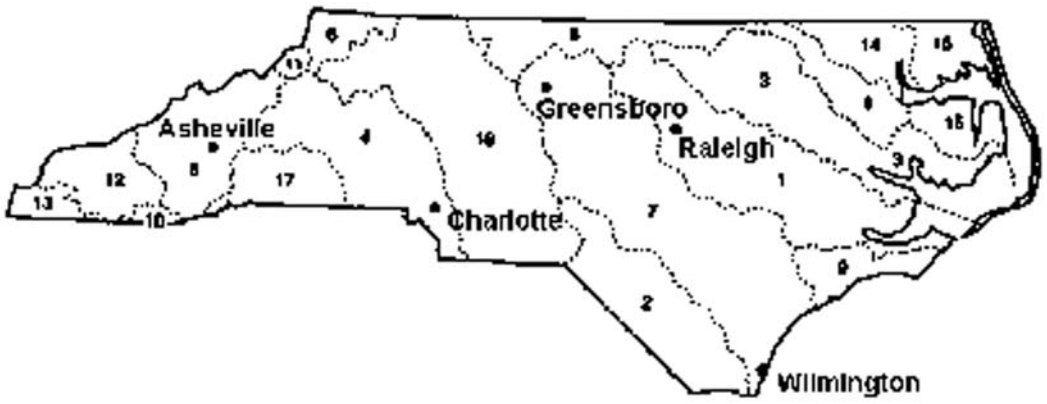
- A sequence for addressing basins -- A sequence is established to balance workload from year to year. States find it impractical and inefficient to perform all management activities in every basin at the same time. Therefore, in one year a state may focus on monitoring in one-fifth of its basins; assessment and priority setting in another one-fifth; modeling and TMDL development in another one-fifth; developing management plans in another one-fifth; and implementing management plans in the remaining one-fifth of the state's basins. In succeeding years of the cycle, efforts rotate among the basin groups. It takes time to work into this cycle, so the state must determine the sequence in which basins will be addressed (see the North Carolina highlight).

In choosing a sequence, most states take into consideration the workload requirements as well as the degree of water quality impairment or environmental risk. Other considerations include data availability and stakeholder support. See the Washington highlight on for a description of the factors that state considered in establishing its sequence.

North Carolina's Basin Cycle

Below is the schedule for all 17 basins within the 5-year planning cycle of North Carolina's basin management approach. This schedule will be repeated every 5 years to provide a long-term management framework that can build on past efforts. North Carolina completed its first round of basin management activities for the Neuse River Basin in 1993 with approval of the basin plan and issuance of NPDES permits. The next cycle of activities for that basin will be completed in April 1998. Activities for all 17 river basins will be completed by November 1998. For an individual basin, the activities within the 5-year planning cycle are as follows:

Activity	Time Frame
Data collection	Years 1-3
Data analysis and modeling	Tears 1-4
Basinwide management plan development	Year 4
Review and approival of plan and NPDESS permits	Year 5



NO.	RIVER BASIN	MONTH	YEAR
1	Neuse	April	1993
2	Lumber	November	1994
3	Tar-Pamlico	January	1995
4	Catawba	April	
5	French Broad	August	
6	New	November	

NO.	RIVER BASIN	MONTH	YEAR
7	Cape Fear	January	1996
8	Roanoke	January	1997
9	White Oak	June	
10	Savannah	August	
11	Watauga	September	
12	Little Tenn.	October	
13	Hiwassee	December	

NO.	RIVER BASIN	MONTH	YEAR
14	Chowan	January	1998
15	Pasquotank	January	
1	Neuse	April	
16	Yaddin	July	
17	Broad	November	
2	Lumber	November	1999

Basinwide Discharge Permitting Schedule for North Carolina's 17 Major River Basins

Presented above are the month and year in which issuance of discharge permits commences in each of the state's major river basins. Basinwide water quality management plans are to be completed for each basin several months prior to these dates.

North Carolina's Basin Cycle

North Carolina's basin approach includes an emphasis on protection of surface water sources of drinking water. In addition to the 17 major river basins, the Department of Environment, Health, and Natural Resources has identified over 200 smaller watersheds supplying drinking water to communities. These water supply watersheds range in size from 3 to 300 square miles and cover about 23 percent of the state. Local governments are required to develop and implement watershed plans protective of drinking water. These plans address allowable density and types of development in these watersheds or portions of watersheds.

North Carolina's basin approach thus assesses water supply protection needs along with other factors and identifies priorities for further protection throughout the basins. Other factors considered in setting priorities for action include ambient water quality, fish tissue contamination, nonpoint source impacts, NPDES permits, and storm water impacts.

- A schedule for management activities -- Once the statewide sequence is established, a detailed schedule of management activities is developed. The schedule specifies when particular activities will occur during the 5-year cycle, thus providing a long-term reference for all stakeholders. Appendix B contains the detailed schedule for basins in Nebraska; the first 5-year cycle shows how activities will be phased in across the state, and the second 5-year cycle indicates how activities ultimately will be coordinated across the state.

In many states, the management cycle will have to take into account the goals, objectives and activities of a broad range of programs, agencies and public interest groups who may also be stakeholders and basin team participants. For example, Delaware will incorporate other natural resource (e.g., fish and wildlife) and county planning agencies. A management cycle for states that take an integrated resource management approach may have different activities, structure, and timing than those that focus exclusively on water quality. For example, Idaho's Department of Environmental Quality will host workshops to build basin teams from public resource management agencies, interested citizens and tribes. Each team will determine the cycle for its planning basin.

Most of the examples provided in this document focus on programs of state water quality agencies. However, urban planning and zoning (county planning agencies), habitat restoration and species protection plans (fish and wildlife agencies), and soil conservation and animal waste management (agricultural agencies) can all contribute to the preservation and protection of waterbody integrity.

Washington's Basin Cycle

By 1999, the Washington Department of Ecology will be planning, collecting data, analyzing data, managing information, and issuing permits for at least four basin management units per year. Baseline program activities such as enforcement and compliance will continue on a statewide basis. The Department used the following factors to establish the schedule of activities in each basin management unit:

- Number of dischargers and permit workload
- CWA Section 303(d)-listed waters
- Completed TMDLs
- Availability of ambient monitoring data
- Threats to beneficial uses (e.g., population growth)
- Likelihood of stakeholder support
- Historical water quality initiatives (e.g., NPS projects)
- Existing and potential funding including grants
- Workload balance.

2.3 Stakeholder Involvement

A watershed approach creates opportunities for a broad range of stakeholders to play meaningful roles in basin plan development and implementation. Success depends on the pooled resources, energy, and regulatory authority of multiple stakeholders. Stakeholders are all agencies, organizations and individuals that could be affected by water quality management decisions. They may include:

- The state water quality agency
- State agriculture, forestry, and wildlife agencies
- State public health agencies
- Municipal and industrial dischargers
- City and county governments
- Trade associations
- Environmental groups
- Chambers of Commerce
- Local offices of Federal agencies
- EPA Regions.

Special Stakeholders in Delaware, Idaho, and Texas

In Delaware, basin management teams include county planning authorities. Their participation allows the Department of Natural Resources and Environmental Control to more effectively deal with land use issues that impact physical habitat and to better coordinate their local management activities.

The Idaho Department of Environmental Quality and U.S. EPA Region 10 are jointly developing a basin approach for Idaho. Much of Idaho's land is federally owned and managed by resource agencies such as the Bureau of Land Management and the Forest Service. A key objective for Idaho is to engage these resource agencies directly in the process.

The Texas Natural Resource Conservation Commission is incorporating their Water Utilities and Water Resources (water rights) Programs into their basin framework. These types of stakeholders, often neglected by traditional water quality programs, add valuable insight and experience. For example, the Water Utilities Program has established goals to reduce pollutant loading to protect drinking water supplies that are consistent with water quality agency goals. The Water Resources Program brings issues such as the timing and level of diversions into the basin management arena.

Stakeholder roles and responsibilities should be defined for each stage of the management cycle. These roles and responsibilities can include:

- Data and research sharing
- Joint monitoring
- Identification of waterbody stressors
- Priority setting
- Public meetings for goal setting
- Public outreach events such as presentations or festivals
- Reviewing management plans
- Shared commitment of resources for plan implementation.

The highlight above describes efforts by three states to include key stakeholders. The companion volume to this document, *Watershed Protection: A Project Focus* (U.S. EPA, 1995), also contains examples of stakeholder involvement.

2.4 Strategic Monitoring

Most types of monitoring are strategically coordinated by basin to address various needs such as:

- Identifying stressors and their sources
- Determining water quality status and trends
- Targeting priority waterbodies/watersheds for action

- Evaluating the effectiveness of management actions
- Developing models to support TMDL development and permit issuance.

States that implement watershed approaches generally modify their existing monitoring networks to improve cost efficiency by focusing on one or a few basins at a time rather than the entire state. Monitoring programs often feature:

- Maintenance of a statewide fixed-station ambient network for physical/chemical parameters, monitored monthly or quarterly; may have fewer sites than previously.
- A network of "rotating basin" monitoring sites sampled only 1 or 2 years out of the basin cycle; some new sites may be selected each cycle to address watershed-specific concerns and to measure the effectiveness of controls
- Increased biological monitoring tailored to the ecoregion(s) or subregions and their reference conditions
- An increased number of intensive surveys for model development (e.g., for TMDLs)
- A return to each basin at regular intervals (e.g., 5 years) to conduct intensive surveys and rotating monitoring. Continuous enforcement activity; compliance monitoring of wastewater treatment facilities may remain independent of the rotation cycle or may focus on specific basins in a given year.

Features of basin-oriented monitoring in Washington and South Carolina are described in the highlight.

2.5 Assessment

Assessment is the process of determining levels of water quality and ecosystem impairment and identifying sources and causes of this impairment. States have been assessing water quality for many years under CWA Section 305(b). Assessment typically involves comparing monitoring data to state water quality standars to determine whether each waterbody's designated uses (e.g., aquatic life, swimming, drinking) are being achieved. Statistical analyses also may be done to determine whether water quality is improving or declining over time. Thus, assessments are important because they provide the basis for evaluating the success of past management actions and targeting future management efforts.

Two States' Approaches to Monitoring

The Washington Department of Ecology has revised its monitoring activities. "Core" fixed stations throughout the state are sampled monthly every year of the 5-year cycle for basic physical and chemical parameters; targeted watershed stations are sampled monthly for 1 year in a 5-year cycle; biological samples (e.g., benthic macroinvertebrates, phytoplankton, fish) are collected mid-summer in year 3; and lakes are sampled twice annually, near the start and end of the growing season. Compliance monitoring occurs in years two or three in the cycle for a given watershed. Intensive surveys are initiated in year two and are completed in years three or four.

The South Carolina Bureau of Water Pollution Control has also revised its monitoring program.

The Bureau will continue its statewide primary network of over 200 sites on major rivers and estuaries. However, its secondary network now focuses almost entirely on watersheds in one basin per year, with emphasis on

- Waterbodies listed under CWA Sections 303(d), 304(l), and 314
- Watersheds with limited water quality data
- Known point source and NPS problem areas
- Waterbodies impacted by groundwater
- Waterbodies needing wasteload allocations.

In recent years, state 305(b) assessments have focused on biological measures of ecosystem integrity in addition to chemical measures. For example, biological assessments of streams may include measures of fish and benthic macroinvertebrate assemblages and habitat quality. This focus on aquatic ecosystem integrity is consistent with watershed protection approaches and, in fact, a state may choose to set the water quality goals for a basin or its watersheds in terms of biological integrity. If a state has developed biological criteria, these can be used to develop water quality goals for individual basins. One basin may have a set of biocriteria for each ecoregion that crosses basin boundaries.

States incorporate assessment results into their management plans. This information also appears in state Section 305(b) reports, but its presence in basin plans makes the assessments more accessible to stakeholders. In later cycles, assessments help determine whether basin and watershed goals are being achieved by the management options chosen in an earlier cycle.

2.6 Assigning Priorities and Targeting Resources

As discussed in Section 2.2, states often develop their sequences based on factors such as workload considerations, data availability, and waterbodies needing TMDLs. Once the sequence is established, the state sets priorities for water quality protection and restoration needs within each watershed as the watershed arises in the management cycle.

Prioritization and targeting may be thought of as two separate steps. *Prioritization* is the process of ranking water quality concerns. *Targeting* is the process of deciding how resources should be allocated to address priority concerns. For example, waterbodies in a basin may be prioritized or ranked according to such factors as

- Severity of risk to human health and the aquatic community
- Impairment to the waterbody (documented or potential)
- Resource value of the waterbody to the public.

The targeting step may involve selection of specific watersheds or waterbodies for special management attention (e.g., as local watershed projects), based on

- Ranking from the prioritization step above

- Availability of staff and financial resources
- Overall planning goals (e.g., statewide or basinwide goals)
- Willingness to proceed on the part of local stakeholders.

Targeting allows states to use limited resources to address priority ecosystem concerns. New priority watersheds or waterbodies may be selected during each management cycle.

Prioritization and targeting of watersheds and waterbodies are described further in *Geographic Targeting: Selected State Examples* (U.S. EPA, 1993b). A method developed by the State of Oklahoma is described in the highlight on the next page.

A Watershed Targeting Approach

In the late 1980s, the Oklahoma Conservation Commission delineated approximately 300 watersheds for NPS assessment. The agency used a numeric index method for ranking these watersheds based on waterbody-level information. For each watershed with adequate data, three factors were calculated:

- *Beneficial Use Factor*: Each assessed waterbody received a score according to degree of use support from the EPA Waterbody System database. Scores range from low (1) for a fully supporting waterbody to high (4) for a nonsupporting waterbody. Weights were assigned based on waterbody size.
- *Human Use Factor*: Highly populated watersheds and those containing major recreational attractions received higher scores (e.g., 4 on a scale from 1 to 4).
- *High-Quality/Nondegradation Factor*: This factor was scored according to ecological value of assessed waterbodies. Scores range from low (1) for habitat-limited fisheries to high (4) for outstanding resource waters. Scores were weighted by waterbody size.

For more detailed information on this and other state indexes, see *Geographic Targeting: Selected State Examples* (U.S. EPA, 1993b).

2.7 Developing Management Strategies

Before preparing a basin plan, the state identifies a range of management strategies and evaluates their effectiveness. Management strategies take into consideration the unique problems of individual watersheds as well as constraining factors such as resources available for control measures, legal authority, willingness of stakeholders to proceed, and the likelihood of success.

The first step in developing management strategies is to establish clear goals and objectives for addressing priority concerns. Goals and objectives can be quite specific. For example, a basin goal could be to reduce or eliminate the incidence of algal blooms in an estuary; a corresponding objective could be to reduce total phosphorus concentrations in its tributaries by 30 percent. The Klamath River Basin highlight describes one goal and one objective that provide a basis for management strategy development for that basin. Similarly, goals and objectives may be developed for certain watersheds. See *Watershed Protection: A Project Focus* (U.S. EPA, 1995) for further discussion of watershed goals.

Goals and Objectives of the Klamath River Basin Restoration Program

The Klamath River Basin was once one of the most productive anadromous fish spawning areas on the West Coast. Physical barriers, habitat destruction, and pollutant loads have severely damaged this important commercial and Tribal fishery. The long-range plan of the Klamath Restoration Program uses a "step-down" approach with specific goals, objectives, and policies or project priorities. Following is an example of one goal and a single objective under this goal.

Goal I: Restore, by 2006, the biological productivity of the basin in order to provide for viable commercial and recreational ocean fisheries and in-river Tribal (subsistence, ceremonial, and commercial) and recreational fisheries.

Objective 1: Protect stream and riparian habitat from potential damage caused by timber harvesting and related activities.

- Improve timber harvesting practices through local workshops; develop habitat protection and management standards for agency endorsement; create a fish habitat database; view existing regulations as minimum expectations
- Contribute to evaluating the effectiveness of current timber harvest practices through: developing an index of habitat integrity; incorporating fish habitat and population data into state water quality assessments; monitoring recovery of habitat in logged watersheds
- Promote necessary changes in regulations--State Forestry Practice Rules; Forest Service Policies in Land Management Plans, BMPs
- Anticipate potential problems by requesting additional state monitoring programs and by modifying State Forest Practice Rules and Forest Service plans to protect highly erodible soils and give priority to protection of unimpaired salmonid habitat.

Source: Klamath River Basin Restoration Program, 1991

Nutrient Trading in the Tar-Pamlico Basin

The Tar-Pamlico Basin is designated as Nutrient Sensitive Waters (NSW) by the state of North Carolina. In 1989, state officials were poised to establish strict new controls on point sources of phosphorus and nitrogen, believing at the time that point source controls were the only enforceable option. However, dischargers concerned about the high capital costs of the new controls formed the Tar-Pamlico Basin Association and worked with the state and two local environmental agencies to craft a nutrient trading program.

The management strategy for the basin now calls for the Association to fund rural best management practices (BMPs) by contributing to the State Agricultural Cost Share Program. The investment by the Association was approximately one-fifth the amount that point source controls were expected to cost, and the reduction in loading to the nutrient-sensitive portion of the basin should be considerably larger than point source controls alone could achieve.

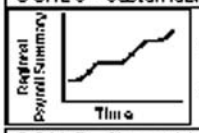
Some strategies developed for a management plan may be basinwide in nature (e.g., phosphate detergent bans or incentives for riparian protection) while others may be more local (e.g., improved animal waste management in a watershed with a high concentration of livestock operations). Implementation of a basin approach allows states to address large-scale problems and local issues at the same time (see the "Nutrient Trading" highlight above).

Stakeholder involvement contributes to equity in point and nonpoint sources controls. Individuals are more likely to negotiate when their knowledge of watershed problems is strong and they see that all sources are being asked to make sacrifices. Figure 2-3 illustrates a method for relating specific goals and objectives to stakeholders for management strategy development. Effective statewide approaches may provide opportunities for innovative management alternatives such as pollutant trading, wetlands mitigation banking, and ecological restoration. (See Section 3.10 for additional information on these topics.)

2.8 Management plans

Management plans are critical. They document the process, the selected management strategies, and stakeholder roles, and also serve as a reference for future basin cycles. Teams, composed of staff of the state water quality, agricultural, public health and other state agencies, are responsible for developing the documents. Plans are updated periodically thereafter.

Figure 2-3. Watershed management goals, objectives, and stakeholder matrix (adapted from Anacosta Restoration Team)

	Participating Programs, Agencies, and Other Stakeholders						
GOAL 1 - Control of Pollutant Inputs							
 Stormwater - Sewage Overflow Control							
NPDES Permits							
Point/NPS Trading Program							
NPS BMPs							
GOAL 2 - Ecological Restoration							
 Channel Reconstruction							
Water Flows							
Redesign Diversion Structures							
GOAL 3 - Habitat Preservation							
 Wetlands/Forests							
Conservation Easement Program							
Wetlands Watershed Scale Advanced Identification							
GOAL 4 - Public Health/Drinking Water							
 Public Water Supplies Comprehensive Groundwater Protection Policy Wellhead Protection Source Water Protection							
GOAL 5 - Biodiversity/Biological Integrity							
 Improve Timing for Diversions							
Contiguous Habitat Corridors							
Species Landscape Needs Analysis							
GOAL 6 - Sustainable Economic Development							
 Plan for Growth							
Eliminate Excessive Soil Loss							
GOAL 7 - Stewardship							
 Public Outreach and Education							

Watershed management plans must specify how goals will be achieved, who is responsible for implementation, on what schedule, and how the effectiveness of the plan will be assessed. Clearly defining an implementation step is a characteristic that separates basin protocols from initiatives for planning purposes only. Experience suggests that formal commitments from all stakeholders are critical before moving into implementation.

The upcoming highlight shows a draft basin plan outline for the Delaware Department of Natural Resources and Environmental Control.

2.9 Implementation

Upon completion and approval of a basin plan, the plan is implemented. Implementation activities may include issuance of NPDES permits with conditions reflecting the plan provisions, implementation of voluntary or mandatory BMPs to control NPS pollutants, critical area protection, habitat restoration, a monitoring program to measure success and guide future plan revisions, and development of TMDLs.

As an example, the *Neuse River Basinwide Water Quality Management Plan* (NCDEM, 1993) describes management strategies for this basin and its watersheds. For the first cycle, the Plan describes point source controls in the Neuse Basin in considerable detail. NPS strategies for this cycle involve numerous existing programs and prioritization of BMP funding. In future cycles, North Carolina anticipates including more detailed information about NPSs and strategies.

Figure 2-4 shows the major steps identified by the Washington Department of Ecology for its statewide approach. Although the terminology differs slightly, Figure 2-4 features all of the common elements presented in this chapter.

Basin Management Plans in Delaware

Following is a draft outline for upcoming basin plans, as developed by the Delaware Department of Natural Resources and Environmental Control.

1. Introduction/Summary

1.1 Purpose of Plan

1.2 Whole Basin Planning Cycle

1.3 Participating Agencies and Publics

1.4 Summary of the Management Plan

2. General Basin Description

2.1 Physical, Geographical, and Ecological Features

2.2 Overview of Potential Environmental Stressors

2.3 Land-Use/Land Cover Characteristics

2.4 Socioeconomics and Government

2.5 Projected Trends in Basin Development

3. Existing Environmental Conditions, Uses, and Stresses

3.1 Land

3.2 Water

3.3 Air

3.4 Resource Integration

4. Major Concerns and Priority Issues

4.1 Issues of Concern

4.2 Targeted Geographic Areas

5. Long Term Goals and Management Strategy

5.1 Goals

5.2 Options Analyzed

5.3 Strategies Selected

5.4 Measures of Success

6. Implementation

Area-Specific Inplementation Activities

7. Next Steps

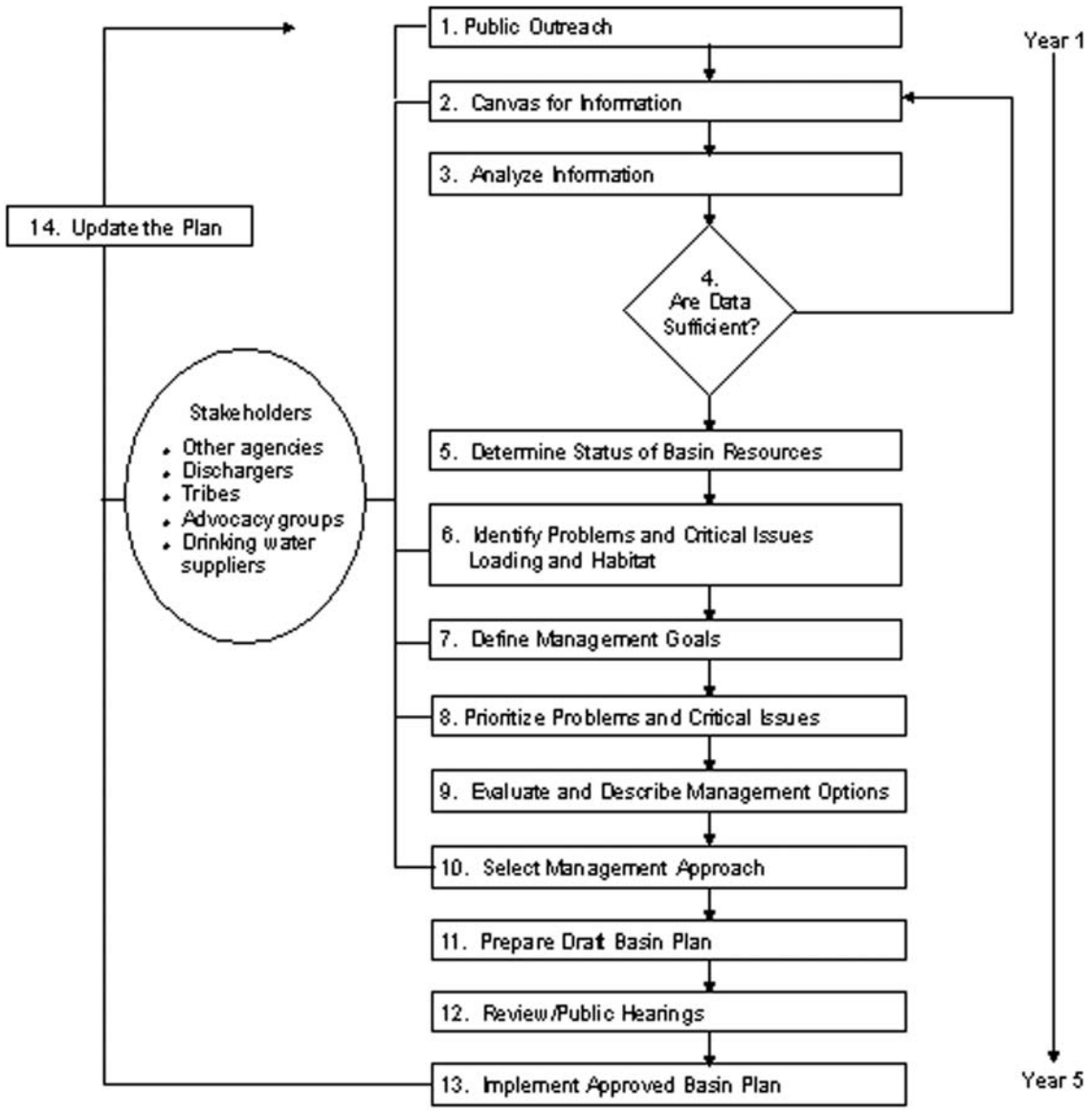


Figure 2-4. Major steps in developing and implementing Basin Water Quality Management Plans (adapted form Washington Department of Ecology)